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**Field Oversight Summary Report  
ACS NPL Site  
Griffith, Indiana**

**Upper Aquifer Investigation  
Monitoring Well/Piezometer Installation**

**July 1996**

# Letter of Transmittal

## BLACK & VEATCH Special Projects Corp.

101 North Wacker Drive, Suite 1100, Chicago, Illinois, 60606, Phone (312) 346-3775, Fax (312) 346-4781

To: Ms. Sheri Bianchin  
United States Environmental Protection Agency  
77 West Jackson Boulevard (SRW-6J)  
Chicago, Illinois 60604

Date: August 6, 1996  
From: Steve Mrkvicka  
Project: American Chemical Services  
Project No.: 71670  
File: C.3

We are sending you: ☒ Attached ☐ Under separate cover via \_\_\_\_\_

☐ Preliminary Report

☐ Specifications

☐ Final Report

☐ Change Order

☒ Other: Field Oversight Summary Report

☐ Addendum

These items are transmitted:

☐ As requested

☒ For your information

☐ For your approval

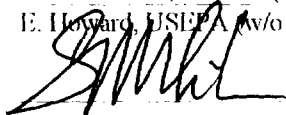
☐ For review and comment

Remarks: Enclosed is the filed oversight summary report for the July 1996 Upper Aquifer Investigation Monitoring Well and Piezometer Installation Work.  
If you have any questions, please call me at 312/683-7849.

American Chemical Services  
Work Assignment 80-5P17

Copy To: P. Hendrixson, USEPA (w/o enclosure);  
E. Howard, USEPA (w/o enclosure); D. Gountanis, USEPA (w/o enclosure)

Signed:



August 6, 1996

## USEPA/ARCS V BVSPC Oversight Summary

Reporting Period: July 15 - July 19, 1996 Hours Worked: 52  
 Site Name/Location: ACS/Griffith, IN BVSPC Project No.: 71670.600  
 USEPA Work Assignment Manager: Sheri Bianchin, RPM  
 Project Manager: Steve Mrkvicka

Personnel Summary Affiliation	No. of Personnel	Responsibility
Montgomery-Watson	2	PRP Contractor and the Drill Rig Geologists
Sterns Drilling Co. (Sterns)	4	Upper Aquifer Well & Piezometer Drilling Subcontractor (2 rigs onsite)
Black & Veatch Special Projects Corporation (BVSPC)	1	USEPA Technical Oversight Contractor

**Summary of field activities:** During the upper aquifer investigation at the American Chemical Service, Inc. (ACS) site, 13 shallow wells and eight shallow piezometers were installed. Site activities began on July 15, 1996, when well and piezometer locations were marked with labelled stakes. The following participants helped pinpoint and stake specific drilling locations for this investigation: Carter Helm, and Robert Lantz of Black & Veatch; Peter Vagt, Clayton Heffter, Clifford Yantz, and Mark VanDoren of Montgomery-Watson; and Luanne Vanderpool of the USEPA, Region V. These specific locations were based upon access; previous Hydropunch® analyses; and Figures 3, 4, 5, and 6 of the revised May 3, 1996, Technical Memorandum for the Upper Aquifer Investigation for the ACS NPL Site Pre-Design Effort. The May 3 document was modified by EPA comments outlined in a June 28, 1996 EPA letter to Conestoga-Rovers. Subsequently, field procedures followed a July 12, 1996 revision to the Specific Operating Procedures (SOP) and the Statement of Work (SOW) guidelines for groundwater monitoring well and piezometer installation. In addition to the wells and piezometers, two locations were identified in a drainage ditch north of the site to install staff gauges.

Also on Monday, drillers mobilized to the N-1 and N-2 piezometer locations to begin drilling. Split spoons were initially used to determine lithology during deep piezometer

installation (P-65 & P-67). By Tuesday, two piezometers were installed at each of the four locations, N-1 through N-4. Each piezometer was constructed using 2-inch diameter, Schedule 40, PVC screens and casings. Screens were 10 slot (0.010-inch) in size. Two different screen lengths were utilized: two-foot screens were installed at the base of the upper aquifer (on top of the upper clay unit) and five-foot screens were installed to intersect the water table (two feet of screen above the water table, if plausible, and three feet of screen below the water table) within the upper aquifer. The upper clay unit was 'tagged' at 13.0 to 13.5 feet bls.

Throughout the rest of the week, both wells and piezometers were constructed inside 4.25-inch inside diameter (ID) hollow stem augers (HSA). Two CME 850 Track-driven drill rigs were used by Sterns and Montgomery-Watson. Split spooning prior to piezometer installation revealed the top of the water table to be at 3.0 feet below land surface (bls). During both piezometer and well construction, the last split spoon was always collected two feet into the clay unit to ensure that the drillers had indeed reached the upper clay confining unit.

Across the ACS site the upper clay unit was encountered between 11.5 feet and 14.0 feet bls. During well installation, the water table was encountered between 0.2 feet bls to 5.0 feet bls. The saturated thickness of the upper aquifer never exceeded 15 feet (at which time a 'well cluster' would have been installed to monitor the upper and lower portions of the upper aquifer). A total of 13 two-inch diameter stainless steel well casings with 10-foot stainless steel screens (10 slot) were installed at the ACS site within the upper aquifer. During piezometer and well installation, a photoionization detector (PID) was used at each drill rig location to monitor borehole vapors as well as to measure split spoon sample headspace readings, which were recorded on the field boring log sheets.

Well screens were positioned to allow the minimum required thicknesses for sand pack and seal placement. All thirteen wells were installed so that the top of the well screen would lie at approximately 3.0 feet bls - satisfying both sand pack and bentonite seal requirements as well as SOW requirements as stated in Section IV. One foot of #7 sized sand was placed above the top of the screen (sand pack material), then 1 foot of 3/8-inch sized bentonite chips were placed on top of the sand, followed by one foot of granular bentonite up to land surface to satisfy SOW Section IV.B.7.b.2. Bentonite placement was always followed by proper hydration to allow expansion, thereby sealing the sand pack within the upper aquifer.

The ACS upper aquifer investigation wells or piezometers were constructed by Sterns drillers under the direction and supervision of Montgomery-Watson personnel. Typical construction involved drilling and sampling with 2-inch ID stainless steel spoons at 2.5 foot sampling intervals (one foot centers); PID analyses and logging/classification of material encountered until approximately 2 feet into the upper clay unit; lowering/assembling the well screen and riser (casing) into the borehole after measurement of well construction materials are recorded; capping the riser which prevented any material from falling inside the well; and slowly pouring filter sand (Global Filter Sand #7) around the riser pipe. Drillers were also careful not to cause bridging of well materials and knew where the top of materials lay by constantly using a down-hole tape measure. Drillers assured themselves that the sand pack was at one foot above the top of the screen. Drillers then poured one foot of 3/8 inch bentonite chips, then poured at least one foot of granular bentonite for a total plug or seal thickness which ranged in thickness from 2 to 3 feet above the filter pack. Protective tops (stick-ups or 'pro-tops') were installed at the end of well construction. Pro-tops were installed in a way that would not interfere with the well's sand pack. The bottom of the pro-top was placed onto the firm bed of the top of the sand pack, then granular bentonite was used to seal both the outer annular space as well as the inner annular space to stabilize and secure the pro-top in place.

In order to achieve maximum stability since a minimal seal was in place, BVSPC Oversight personnel waived SOP Section IV.B.8.a.9, which allowed placement of sand and bentonite between the protective pipe and well casing.

Well development was also conducted during the week of July 15, 1996. Once all wells were constructed (by Thursday afternoon), the Sterns crew members and drill rigs were used to help develop recently completed wells. Before development procedures were initiated, depth to the static water level and total well depth were measured from the top-of-casing of each well. The difference yielded the length of the water column which was then used to calculate both the well volume and the sand pack volume. Most wells and corresponding sand packs revealed a capacity of 12.4 gallons of groundwater. This represents one well volume.

The surge and purge development method was used during this investigation. One drilling crew used a surge block while the other crew used a stainless steel bailer. Surging each well forcefully ejected sediment and fines from inside the well casing, well

screen, and between the screen slots. Once these materials are put into suspension, a pump was used to evacuate the water column which included these sediments. The discharge was placed into a five-gallon bucket to monitor the amount of water developed. Development water was either drummed or dispersed onsite depending on the well location (drummed if inside the contaminant plume). Once three volumes were removed (approximately 36 gallons), measurements such as temperature, pH, and specific conductivity were collected after each well volume was removed.

After at least three set of measurements were recorded AND if stability of parameters was evident, well development was complete. Some wells required up to 150 gallons (13 well volumes) removed until parameters were stabilized. Turbidity measurements were also collected where final turbidity results had averaged near or below 30 NTUs. All wells recharged quickly except MW-41 which was constructed in a silty clay strata rather than a sandy strata.

At the end of the investigation, all wells were labeled and secured with padlocks. All thirteen wells are now ready for sampling on August 5, 1996. Montgomery-Watson personnel also installed two staff gauges in the drainage ditch/pond north of piezometer P-63 near MW-48 and MW-38.

**Problems Encountered/Corrective Actions:** As mentioned above, the wells required more stability due to the shallow nature of the water table (and well screen). Since the wells had screened intervals from 3 to 13 feet bls, top-of-sand packs were typically 2.0 feet bls. Bentonite seals were constructed from 2 to 0 feet bls. For security and stability reasons (the pro-tops and the wells were vulnerable), BVSPC Oversight relaxed the regulation which required no bentonite between the well casing and the well's protective top.

Numerous and thick clay lenses prevented well installation at the original MW-41 location. After attempting numerous offset locations (after EPA guidance and consultation), a successful location (silty clay and sand) was finally attained at approximately 60 feet south of the original location.

While developing MW-41 on Friday morning, a bailer was used to purge and surge. When the bailer was brought up to land surface, many remnants of wax paper were found inside the well. These pieces of paper had blue ink writing on it


(indistinguishable). Montgomery-Watson did not know if this was an act of vandalism or if the paper could have been stuck in the well screen prior to installation.

The following key can be used to correlate the numerical labels for each well and piezometer installed during the investigation with the alpha characters used in SOW Figure 6.

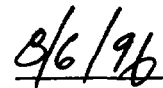
Piezometers	N-1	N-2	N-3	N-4
Shallow	P-64	P-66	P-68	P-70
Deep	P-65	P-67	P-69	P-71

Wells	A	B	C	D	E	F	G	H	I	J	K	L	M
MW-	37	38	39	40	41	42	43	44	45	46	47	48	49

Signature: \_\_\_\_\_



Date: \_\_\_\_\_



t:\projects\acs\ fld-rpts\acs2.wp5



6/5/96

TIME	WELL #	WATER LEVEL
1007	PZ 59	3.20
1045	PZ 17	2.3 37
1050	PZ 18	6.42
1054	PZ 15	7.12
1058	SG 1	
1102	PZ 13	17.96
1105	PZ 16	15.34
1115	PZ 19	6.13
1120	MW 15	4.14
1215	PZ 02	10.35
1218	PZ 04	4.08
1222	PZ 14	11.60
1225	PZ 20	7.74
1228	PZ 12	16.40
1232	PZ 11	15.40
1240	PZ 10	14.99
1305	MW 02	4.43
1310	MW 09	14.56
1311	MW 14	6.34
1314	MW 34	13.05
1316	MW 29	13.59
1318	PZ 27	7.34
1320	MW 21	9.33
1322	PZ 23	5.11

Comments

DRY

Need new  
pump.checked MW 9  
& MW 34

- 7/6/96

7/14/96 - SUN.

57

1340 Carter Helm, BU-Atlanta,  
Leave House for Atlanta Airport  
1540 Report Atlanta - delayed  
1800 Arrive Chicago O'Hare  
Taxi to EPA vehicle parking  
1900 Obtain EPA 1740 urn, begin  
Drive to Lansing to  
Fairfield Inn.  
20:00 Arrive at Hotel

C. Helm

58

7/15/96 - Mon.

- 0715 Finish review of EPA comments on 5/3/96 Upper Aquifer Investigation Technical Memorandum (at 1461)
- 0820 Leave Hotel for site
- 0850 Arrive AES site.  
Meet Ben McGerchy, Montgomery-Watson (m-w) Construction Engineer
- 0930 Drillers Jerry Hutton & Ryan Krauss, from Stearns Drilling (Putton, Mich.) arrive on site.
- 10:00 meet up with  
Pete Vast, m-w PM,  
Rob Lintz, B.U. PE,  
Lynne Underpool, EPA Geologist  
Clayton Haffner, m-w
- 10:15 Begin to locate all well and PZ locations in (as) a group.
- Piezometers N-1, N-2 are ~ 30 to 50 feet North of RR tracks south of ACS:
- N1-shallow = P64 // N2-shallow P66  
- Deep = P65 - Deep P67

7/15/96

59

- 1100 N3 and N4 Piezometers = behind construction trailer (Thru ASC)
- N3-shallow = P68 | N4-shallow = P70  
- Deep = P69 | deep = P71
- Locate mw J (mw-46), mw C (mw-39),  
mw B (mw-38), mw L (mw-48),  
mw A (mw-37), and mw M (mw-49) near the P63 location, E of SW men.
- 1300 Group locates mw D (mw-40) east of Colfax Rd. (East) near P58 & 59.
- 1410 Travel to South of Reder to stake mw-K (47), mw-E (41),  
mw-I (45), mw-H (44).
- 1430 Stake out mw-G (43) and F (42) in fields.
- 1510 2 drill rigs (2 crews) mob to N1 & N2
- Both use 4.25" Hollow Stem Augers & Spoons
- P-65 deep = Mark Vandoren (Montgomery-Watson)  
and drillers Ryan & Jerry (CME 850)
- No sign. PID readings
- P-67 deep = Cliff Faritz (Montgomery-Watson)  
and Rich Bennett, John Velleit = Drillers
- ▼ (with table) at 3.0' bls, 13.5' Bottom of Screen
- P-64, P-66 offset 4' N of deep PZ's.
- PVC 2", Deep = 2' screen, Shallow = 5' screen
- Sand Pack's 1.0' over top of screen, plug to surface
- 18:30 Depart site. ~~S/S/oh~~

602/18

7-15-96



MONTGOMERY WATSON

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Chicago, IL 60604

Ben McGeachy  
Construction Engineer

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Chicago, IL 60604

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Region V

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CSY

HYDRO

Environmental Services

Clifford S. Yantz  
Hydrogeologist/Owner

16200 Fenton Ave.  
Detroit, MI 48219  
313/537-4480

7-16-96 - TUE.

61

0645 Depart Hotel

0720 Arrive on-site

meet Ron Wells - construction  
crew in trailer with Ben.

Cliff and Mark are calibrating &  
fixing PID's - lucky they  
brought an extra PID instrument

0800 Mobilize to N-3, N-4

west of construction area.

for N-4 locale: Cliff

Jerry, Ryan begin drilling

split spools begin (P-71)

clay at 12.5' b/s

PID = 16 ppm - Hardspace only

P71 deep P2 2 1/2' screen PK 2"

cap used during construction

of piezometers to prevent materials

0830 Mark, John, & Rich at inside

N-3 locale, 100' NW of N-4

shallow is P-68

deep is P-69

top clay = 12.5' b/s (15.0' end of S.H.)

2.5' screen used

top of sand pack = 8.0' b/s

top of bentonite plug = 6.0' b/s

granular to 0.0' b/s.

62/9/4

7-16-96

9:05 start P-68 drilling  
Note: Sand water table  
is at 0+.3' b/s, top  
of screen for shallow PZ  
will be at 2.0' b/s to  
allow 1.0' sand above screen  
and 1.0' hole plug above  
sand pack - Per SOP/SOW.

P-70 total depth (well) 7.5' b/s  
4.0' PVC casing stick-up

Note: Acetone odor  
at N-4 locale during  
drilling activities

9:15 Begin demob from N-3, N-4  
Stearns has set up a  
decon station at the  
construction Trailer  
Mark's rig is 1st to demob

9:45 Decon Procedures are  
being followed correctly  
Stearns cleaner placed on  
Trailer to use anywhere  
needed - Rig also deconed.

9:50 I believe Pete Vogt has  
misguided drillers concerning  
Upper Aquifer wells ...

7-16-96

63

10:00 Spoke to Steve Brachin, EPA,  
concerning our screened intervals.  
Pete Vogt was mistaken when  
he told drillers & geologists  
to place screen on top of clay.  
SOP/SOW is correct for  
screen placement. Screens  
for areas of high water tables  
- what we are encountering,  
each well will be screened so  
that a minimal seal can be installed.

▼ is between 2 - 3.0' b/s  
Therefore screen interval must  
be from 3 to 13' b/s to  
comply with SOP/SOW.  
Borehole, however, will be  
advanced into 2' of clay (spoons)

10:20 Drillers concerned with pro-top  
Since we have the following:  
0-1' b/s granular bentonite  
1-2' b/s hole plug - bentonite 3/8" chips  
2-3' b/s #7 sand 1' above screen.  
Pro-top can NOT intersect sand pack  
so pro-top base will be on top of sand  
We need more stability for pro-top.

(64) *appt*

7-16-96

Due to the shallow nature of seal & sandpick, I have allowed deletion from sow of B, 8, a, (9). For proper Seal we must place either sand, or bentonite - granular between protective pipe and well casing since pro-top is sitting on sand-pick. This will also improve well security as well as integrity.

10:45 John, Rich, Mark mobilize, after rig/equipment decon done to 'J' location, mw-46.

10:55 Cliff, Jerry, Ryan mobilize to 'D' location mw-40 after Decon is complete.

11:25 AT mw-46 ▼ found at 3.9' b/s  
f clay encountered at 12.0' b/s  
at MW-46, use 10' PVC  
10 slot screen (2" dia) Johnson sand  
4.0' stick-up - to find easily  
in wetland area.

12:35 clay encountered at 13.5' b/s  
at mw-40 - End of Colfax Ave  
▼ at 3.5' b/s, Screened from  
3.5' b/s to 13.5' b/s

7-16-96

*appt*  
(65)

13:10 Both mw-46 & mw-40  
complete - granular bentonite to surface  
Basin full decon procedures.

14:00 Rig with Mark, John, & Rich  
mobilize to near L - mw 48  
Photo #1 (Frame #25)

14:10 Rig with Cliff, Jerry, & Ryan  
mobilize to near 'M' at  
mw-49 - Photo #2 (Frame #24)  
about fifty feet East of P-63 (and pond).

14:20 ▼ at 2' b/s at mw 48

14:30 order at 5.5' b/s, 70 ppm H.S.  
clay at 11.5' b/s

confirmatory spoon collected  
Photo #3 (Frame #23) of Cliff  
using PID on split spoon  
(mw-48) samples (detected from .3 to 70 ppm)

15:15 wells completed with a  
3.0' stick-up & bentonite  
sand to ground level. Note:  
pro-tops have been installed  
immediately after well construction.

16:00 Decon both rigs and  
all equipment. We have  
drummed all cuttings for  
mw-48 and mw-47 per SOP.

66

7-16-76

16:50 After Decon is complete  
Cliff, Jerry, & Ryan mobilize  
to mw-A (mw-37) and  
Mark, Rich, and John have  
mobilized to mw-C (mw-37).

The following will  
construction materials that  
will be used for this investigation  
are: - Johnson <sup>15.5' 51s</sup> ~~15.5' 51s~~ screens & casing  
- Global Filter Sand #7 size  
- Hole plug coarse grade & 3/8" chips  
Wyoming bentonite.

1715 Drilling and split spooning  
at mw-37 - Photo 4, (Frame 22)

1745 Pouring sand pack thru hollow (HSA)  
stem augers while slowly  
raising the HSA's Photo 5 (Frame 21)

1805 mw-37 completed, stiff  
clay encountered at 13.5' 51s  
▼ at 3.0' 51s, screen from  
3.0 to 13' 51s.

1820 mw-37 completed.

1830 Depart site

7-17-76-wed

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06:45 Depart Hotel for site

07:20 Arrive at site  
Drillers load clean  
augers & restock equipment  
& supplies. Decon complete.

8:00 Mark, John, Rich mobilize  
(Rig on 2 trailers) to Farmer's  
Fields - mw-~~40~~ 47

08:20 Cliff, Jerry, & Ryan  
mobilize to LaSalle Steel  
Co. fence via California Rd  
to begin to cut fence to  
install mw-B (mw-38)

08:35 Begin spooning at mw-~~40~~ 47  
▼ at 5' 61s at mw-~~40~~ 47  
clay at 12.5' 51s - drillers  
" " 13.0' 51s in spoon  
Photo # 6 (Frame 20) at mw-47.

Note: stake was mis-labeled  
as mw-40, I changed it to -47.  
per SOW (SOW map & Key.)

09:05 Sand pack placement begins  
at mw-47 - Tape measure  
is used constantly to determine  
top-of-materials Photo # 7 (Frame 19)

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7-17-96

- 09:10 Photo #8 (Frame 18) of mw-37 from yesterday.  
 09:15 mw-47 completed Ryan starts.  
 09:15 Matt Mustomudi on site  
 1:30 Sheri Branchin on site  
 to sample residential wells.  
 9:45 Cliff's crew is having  
 problems with access  
 to mw-38, at LaSalle Steel.  
 They will use a chain saw  
 to help mobilize to mw-38  
 a very wooded area.  
 10:15 AT mw-41, location, mw-41,  
 clay from 5.0' bls to  
 15.0' bls, work stops  
 for EPA consultation.  
 Photo #7 (Frame 17) of abundant clay.  
 10:35 Speak to Sheri Branchin  
 who is on site today, she  
 said to abandon mw-41  
 with Hole plug/Bentonite seal  
 mobilize to G, mw-43  
 To check lithology - is the  
 clay just local lense or is  
 it throughout the SE area.  
 10:50 Photo #10 (Frame 16) Drilling clay  
 of augers from mw-41 attempt.

7-17-96

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- 11:15 Begin spooring/drilling mw-43  
 in Farmer's Field see  
 Photo #11 (Frame 15).  
 6" clay lense but  
 mostly silty sand was  
 encountered, well is  
 installed here as staked.  
 11:50 I Report results to Sheri.  
 when return to Farmer fields.  
 Photo 12 (Frame 13) of storm & fields  
 12:00 Rain begins to fall.  
 But drillers able to continue.  
 at 7.0' bls at mw-43  
 screen will be 5-15' bls  
 clay at 17.5' bls at mw-43.  
 12:10 Cliff, Jerry, and Ryan finally  
 able to cut mw-B (mw-38).  
 They begin down to later  
 set up on mw-44. mw-38 has  
 screened interval from 3' bls to 13' bls.  
 12:30 Matt with Sheri Branchin, EPA,  
 to determine New 'E' location.  
 She wants it relocated 50 feet East  
 and 50 feet south of SOW location.  
 12:50 Bumper Posts (3) installed at mw-43

70

7-17-96

1310 Cliff's crew (Jerry, Ryan)  
mobilize on mw-44  
while Mark's crew  
sets up on mw-42  
Then goes to lunch.

I watch at mw-44 - Cliff's crew

1320 Spooling begins at mw-44  
▼ at 2.9' fls. Lenses of  
clay throughout. No shale.  
No PID detections, however.

1400 Lightning begins very close  
all operations cease.

1420 Drilling resumes,  
lightening is now distant  
also mw-42 drilling begins  
Mark's crew has finished  
decon procedures & lunch.

1500 I take Sheri, Branches  
to mw-44 and mw-42  
to show her logs and wells.

1520 AT mw-44, we observe  
sand pack construction  
and kimbrite seal integrity.  
I explain my decisions  
to fill up the annulus

7-17-96

71

space between the well  
casing and the protection  
"pre-top" casing. After  
demonstrating to before &  
after screening, Sheri agrees  
with my deletion of D, B, 8, a, 9  
in work plan.

1545 Sheri & I at mw-42  
to increase split spooling  
and clay & sand samples  
from spoon. - again  
inter-fingering is present.

1600 Sheri departs site

1630 Mark, John & Rich are  
having battery problems  
on their rig - They use  
the support vehicle to  
jump it.

1715 Rain becoming very heavy

1735 All personnel depart site

~~W. Helms~~



(72) 7-18-76 Thur

0645 Leave Hotel, Torrential  
Rains all night and  
into morning have  
occurred. Many roads  
are covered with water.

0715 At ACS site, Cliff, Jerry  
& Ryan have discussed & attempted  
the new location of mw-41 ~  
75' SE of original while Mark,  
John & Rich begin to drill mw-45.

0850 All clay at mw-41 offset  
plus its downgradient of clay lens.

0915 Talk to Sheri about  
location mw-41, she  
agrees to move NW  
instead of ~~W~~ SE for  
offset locations. She  
wants a report by noon due  
to an ACS meeting at 1300.

10:10 Two <sup>NW</sup> offsets have been  
completed (Photos 13 & 14  
(Frames 12 & 11) taken during  
these offset locations. Rain  
is off & on all morning.

7-18-76

(73)

11:20 Total of five offsets  
have been completed.  
to either 5' bls or 10' bls  
all have shown clay (still)  
in spoons ... up to 150' NW.

12:20 After seven offsets, I  
call Sheri to report No Luck.  
Begin to wait for her response.

13:10 AT EPA's meeting with Lanning,  
Sheri, Pete, etc., they  
decided to install the mw-41  
offset well at ~50 feet South  
of original location.

"If Laccustrine Clay is  
present (silty clay), install  
the well in it."

14:05 AT ~60 feet South of  
original mw-41, we finally  
find Clayey Silt interfingered  
with sand. Good enough for  
well construction.

1415 Mark's crew finishes  
mw-45 - all cuttings drilled.  
Screened interval from 3 to 13' bls.  
▼ hard to determine due to floods

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mw-41 will have a screened interval from 3413' to 615'.

14:40 mw-41 completed (offsite location.)

15:00 Both drill rig crews begin decom procedures. All wells have been completed, bumper posts, pro-tips, and developing the next.

15:15 Report site to obtain Gas for EPA Van and Gatorade & Ice

15:30 Back on site, go to Farmer's fields to photograph flooding photos 15 & 16 (frames 10 & 9), one of the previously completed mw-43 - Completely submerged in rain water.

16:45 Jerry, Cliff, Ryan finish bumper posts & pro-tips. Rain has stopped.

18:00 John, Rich, mark begin development of mw-46 (J)

19:05 Turbidity = 54 NTUs, other parameters are stable, the clear. Report site

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0650 Report hotel for ACS site

0710 Arrive on site. Today we all develop using rig pumps & surge block or boiler to surge wells.

0845 While boring mw-41 drillers found wax paper with writing on it at bottom of well - unknown if

it was vandalism (last night) or stray paper in screen and/or in mw-41 casing - slow recharge, use boiler Photo #17

10:20 While surge blocking (Frame 8) at mw-47, Mr. Dennis

Rauhse, owner of Tecumseh manufacturing stopped by to tell us he is going to:

A) Mow the field which contains mw-47, 41, 45

B) a Septic tank is to be installed ~ 10 feet North of mw-47.

C) A road will be built E-west thru mw-47 locale

D) He is constructing putting greens/dining range

760/4

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Mr. Rautselang also  
inquired about what  
contamination is on his  
property. We did not  
state any info to him.  
We ~~took~~ <sup>sent</sup> this phone #  
217-924-3433,  
and will tell Pete Vajt  
and Sheri Branchin to  
call him ASAP.

11:08 Photo of surge block used  
by Ryan, Jerry & Mark at  
mw-47, photo #18 & #19, #20  
(Frames #6 & 7) - Decoded both wells.

12:15 Typical calculations for  
amount of development water  
needed are based on a sand  
pack of 11.0' in length.

Length of water column = 14'  
11.7 gal = one volume (filter  
pack and well)  $\times 5 = \sim 60$  gal  
minimum removal.

13:00 mw-47 development completed

13:20 mw-42 " " " "

13:30 Cliff, John, & Rich will develop

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wells in Northern area of site.

13:40 Spoke to Sheri Branchin  
at EPA so she can call

Dennis Rautselang also  
13:50 Spoke to Pete Vajt  
so he can follow-up on  
Monday to Mr. Rautselang.

14:20 Cliff, Rich, & John  
developing mw-49 and  
drumming all development  
water - photo's 21-22

(Frame 4 & 3) Plus readings.  
Parameters which must  
stabilize include pH, Specific  
Conductance, Temperature and  
Turbidity (needs to lower value)

15:00 Typically, up to 132 gallons  
have been removed, and  
water has cleared.

15:30 Photo taken of wax paper  
that was found this  
morning in mw-41, during  
development procedures.

Photo 23 (Frame 2)  
Unknown if vandalism or  
existing condition due to installation

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- 16:10 Development continues  
at mw-44 & mw-37  
± move between both crews to watch.
- 18:15 All development of wells  
is complete. Drillers  
conduct final decom  
procedures before travel.
- 18:30 mark & Clift install  
2 staff Gauges  
just North of Railroad  
tracks, north of P63.  
SG-12 near mw-48. <sup>Photo #26</sup>
- 19:00 SG-11 (staff gauge)  
installed near mw-38.  
mark & Clift also  
lock and label all  
13 wells - Photo frame #1 #0.
- 19:20 ALL depart site

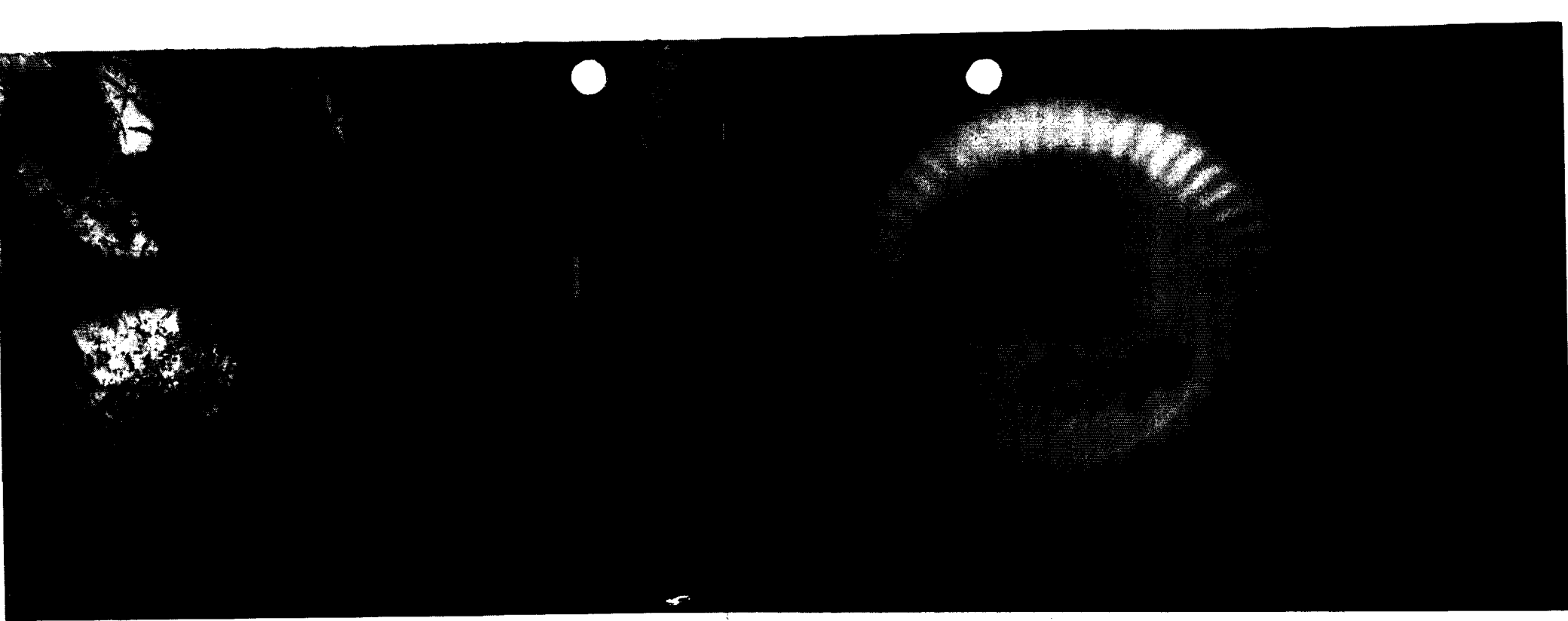
C. J. Kelly

7-20-96 Sat.

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- 0900 Begin to pack-up
- 10:00 Check-out of Hotel
- 11:45 Arrive at EPA vehicle  
park area, fill-up with  
gas, lock-up.
- 12:10 Taxi to O'Hare Airport
- 13:30 Fly to Atlanta
- 17:00 Arrive in Atlanta
- 17:20 Taxi Home
- 18:00 Arrive Home

C. J. Kelly



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 1

Date: 7-19-96 Time: 1835

Photographer: Carter J. Helm

Description: Close-up view of the completed MW-48 well. Note the bentonite plug that was extended to ground surface for maximum well stability. All wells were padlocked and labelled with a white grease pen prior to demobilization.

Site: American Chemical Services, Inc. RD/RA

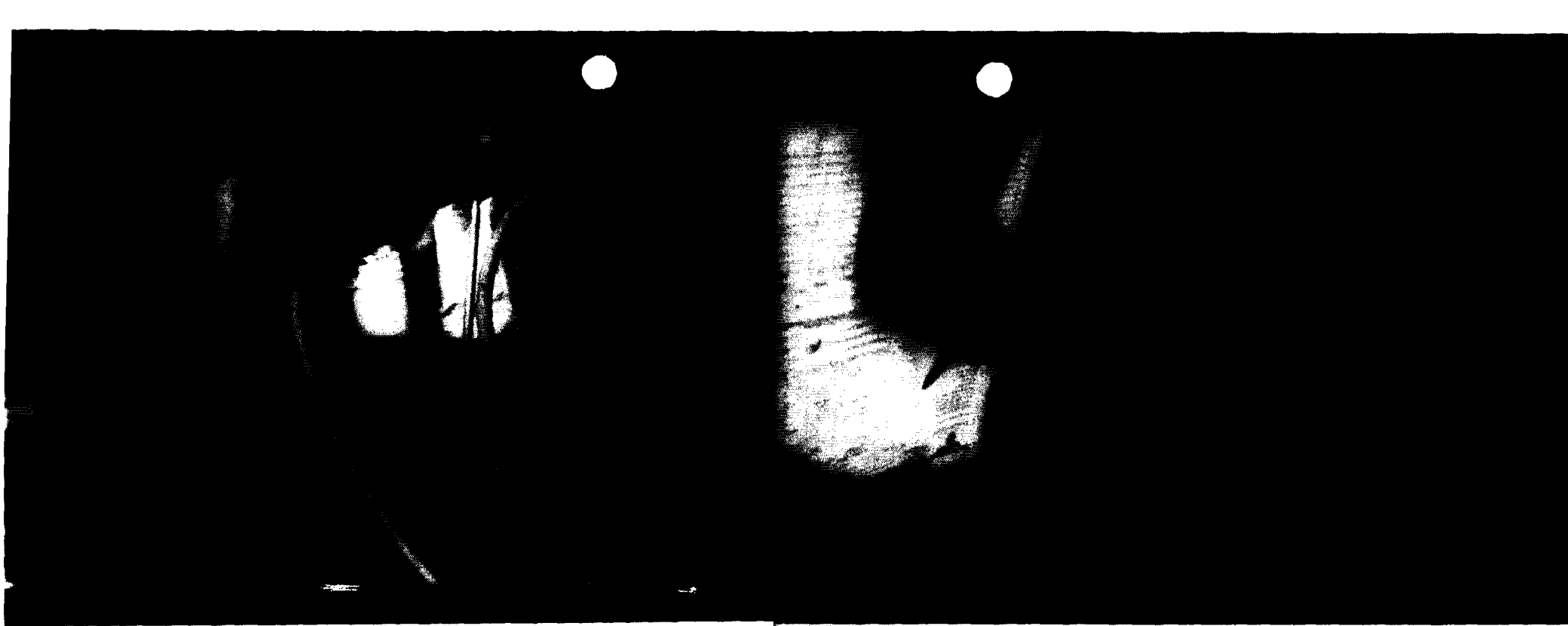
Proj. #: 71670

Roll: 1 Frame #: 2

Date: 7-19-96 Time: 1545

Photographer: Carter J. Helm

Description: A close-up view of the wax paper (with blue ink writing) found down MW-41 during development procedures. The scraps of paper were brought up in the bailer during purge procedures. Drillers were unsure if the paper was an act of vandalism or was inserted into the well screen prior to well construction.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 3

Date: 7-19-96 Time: 1425

Photographer: Carter J. Helm

Description: South view at MW-49. Drillers used a graduated five gallon bucket to determine how much purge volume had been pumped from the well. After volume was measured and recorded, drillers poured development water into a 55-gallon drum for later disposal.

Site: American Chemical Services, Inc. RD/RA

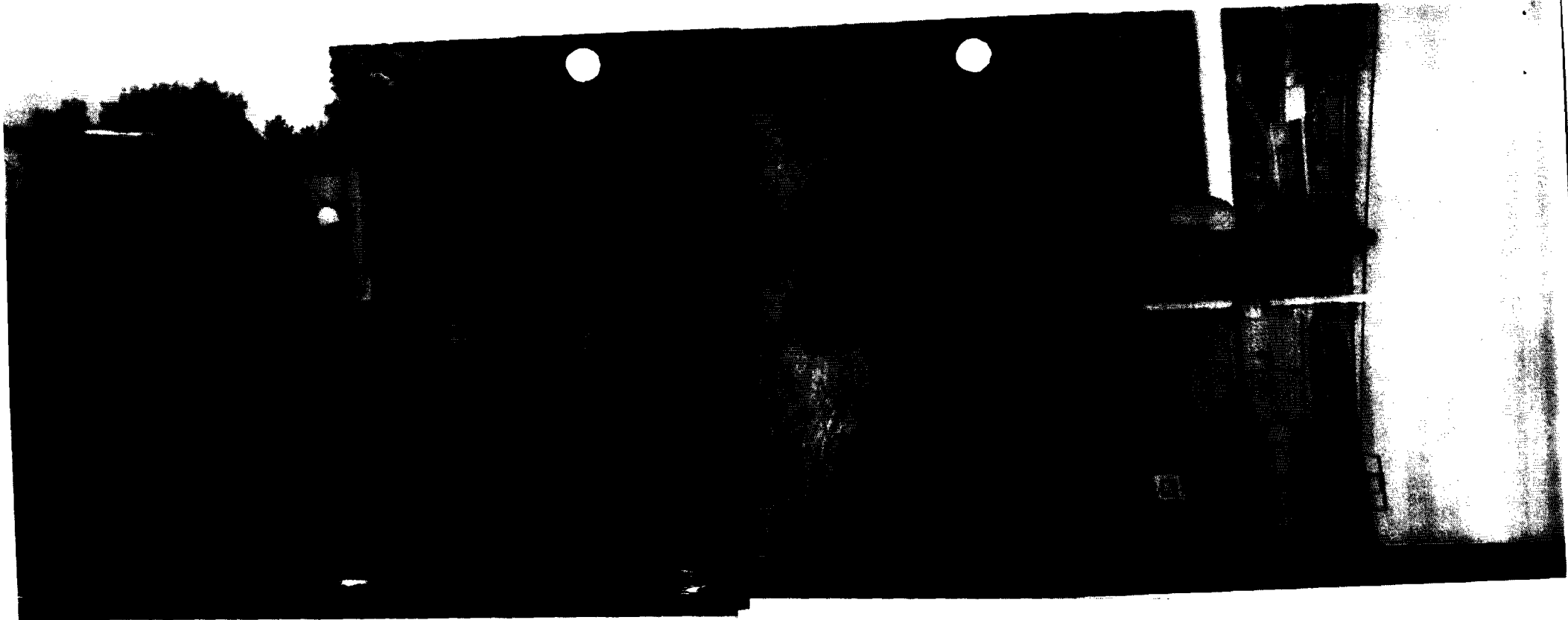
Proj. #: 71670

Roll: 1 Frame #: 4

Date: 7-19-96 Time: 1420

Photographer: Carter J. Helm

Description: Close-up photo of the Montgomery-Watson Geologist noting parameters during development procedures at MW-49. Such parameters as pH, specific conductivity, temperature, water color, odor, and turbidity were recorded on well development summary sheets. Cumulative gallons purged was also noted.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 5

Date: 7-19-96 Time: 1205

Photographer: Carter J. Helm

Description: East view at the MW-47 location. Drillers are using the drill rig's pump to purge the well following surge procedures. Hoses, tremie pipe, and other downhole equipment was disconnected between well locations during development.

Site: American Chemical Services, Inc. RD/RA

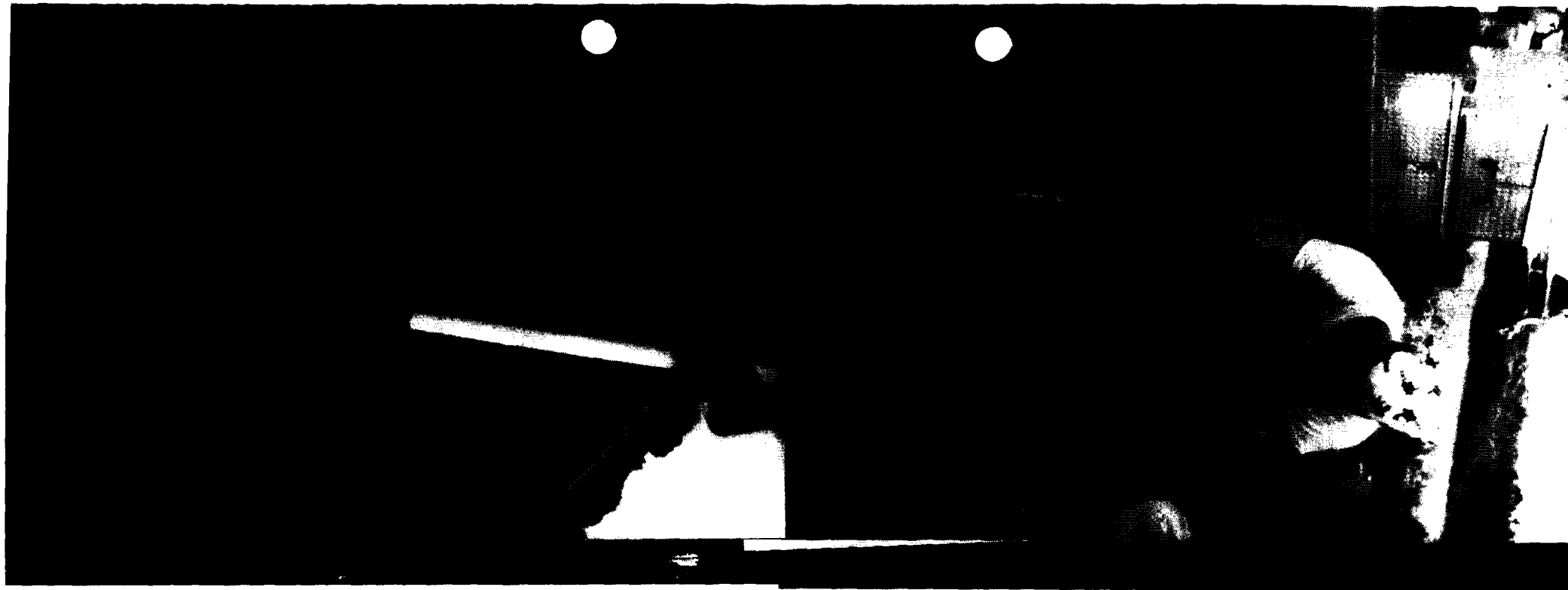
Proj. #: 71670

Roll: 1 Frame #: 6

Date: 7-19-96 Time: 1112

Photographer: Carter J. Helm

Description: Photograph of a driller using the surge block at MW 47. Approximately 20 minutes of surging was conducted before the well was pumped (purged). This cycle was repeated. Up to 150 gallons were purged from some wells during development until parameters stabilized.



Site: American Chemical Services, Inc. RD/RA  
 Proj. #: 71670

Roll: 1 Frame #: 7  
 Date: 7-19-96 Time: 1110

Photographer: Carter J. Helm

Description: A close-up view of the surge block used by drillers to force sediment and other fines out of the well screen and sand pack. The 'surge and purge' method was used to develop the upper aquifer wells.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

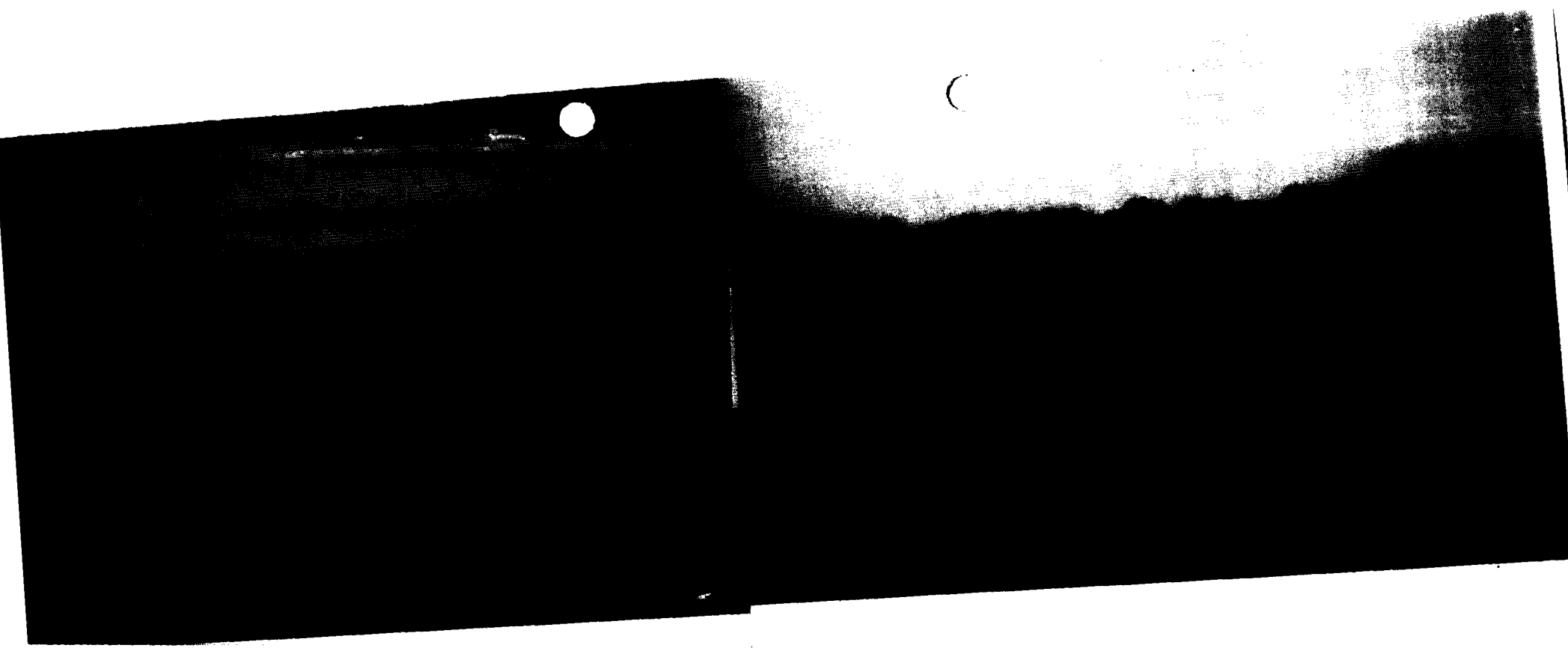
Roll: 1 Frame #: 8

Date: 7-19-96 Time: 0850

Photographer: Carter J. Helm

Description: Photograph of drillers bailing MW-41 during development. A bailer was used here to purge water from the well in addition to surging the well. The pump on the drill rig was sufficient to purge other upper aquifer wells, but not MW-41. Recharge was too slow therefore drillers resorted to bailing the proper volume out of MW-41. Eventually development parameters stabilized and a final low turbidity was noted.





Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 9

Date: 7-18-96 Time: 1536

Photographer: Carter J. Helm

Description: West view of the soybean field submerged in rain water.  
This photograph was taken just north of MW-43.

Site: American Chemical Services, Inc. RD/RA

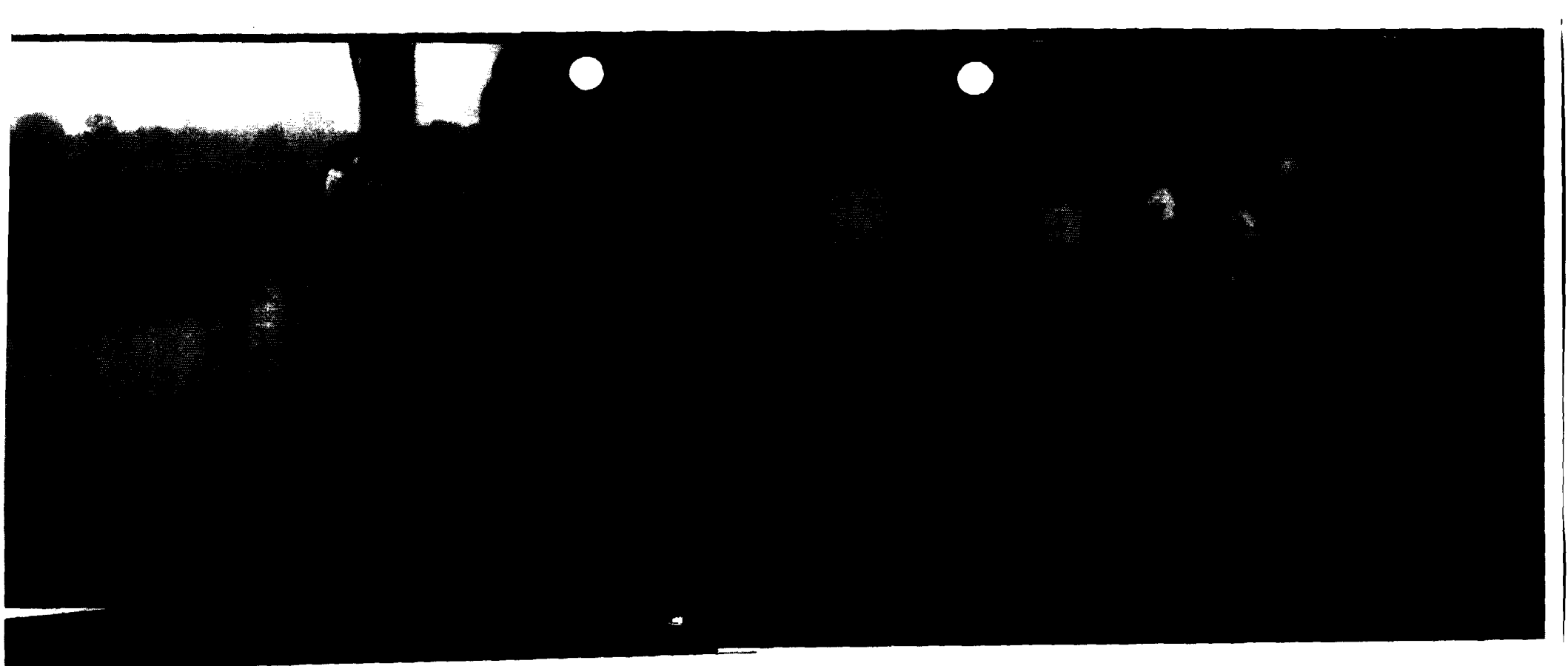
Proj. #: 71670

Roll: 1 Frame #: 10

Date: 7-18-96 Time: 1535

Photographer: Carter J. Helm

Description: A southwest view of the farmer's fields, of which approximately 20% were flooded from last night's torrential rains. Yesterday (July 17), MW-42 and MW-43 were completed in the soybean field. Pictured is the completed MW-43 with bumper posts to protect the well from farming equipment.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 11

Date: 7-18-96 Time: 1110

Photographer: Carter J. Helm

Description: A north view of the drillers attempting another offset location for MW-41. Rain was pouring off and on all morning (July 18). This offset was also unsuccessful due to abundant clay encountered from 4.0 feet to 11.0 feet bls.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1

Date: 7-18-96

Photographer: Carter J. Helm

Description: After a night of torrential downpours, drillers were able to continue drilling the next day by keeping surface water out of the hollow stem augers within which wells were to be constructed. Photographed is an east view of an MW-41 offset attempt which produced clay and was unacceptable for well placement.

Frame #: 12

Time: 1010



Site: American Chemical Services, Inc. RD/RA  
Proj. #: 71670

Roll: 1      Frame #: 13

Date: 7-17-96      Time: 1155

Photographer: Carter J. Helm

Description: East view of drillers working in the farmer's fields (MW-42 & 43 locales) as an electrical storm approaches from the north. Rain and lightning delayed drilling activities intermittently on July 17, 1996.

Site: American Chemical Services, Inc. RD/RA  
Proj. #: 71670

Roll: 1      Frame #: 15

Date: 7-17-96      Time: 1115

Photographer: Carter J. Helm

Description: An east view at the MW-43 location. Drillers have just begun to split spoon at MW-43 located in the farmer's soybean fields east of Arbogast Road and south of Reder Road.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 16

Date: 7-17-96 Time: 1055

Photographer: Carter J. Helm

Description: Using a powerful steam cleaner, drillers clean augers between drilling attempts installing MW-41. Approximately eight different offset locations were drilled before encountering a borehole suitable to produce groundwater from the upper aquifer.

Site: American Chemical Services, Inc. RD/RA

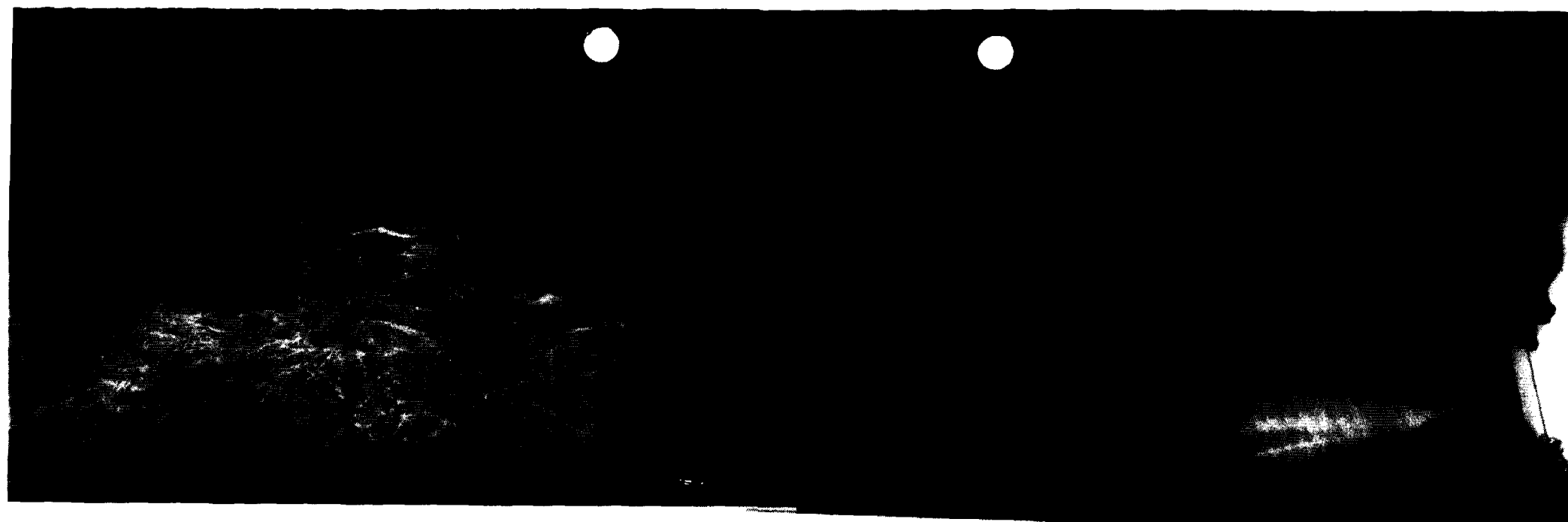
Proj. #: 71670

Roll: 1 Frame #: 17

Date: 7-17-96 Time: 1020

Photographer: Carter J. Helm

Description: A downward view of the 8 to 10 foot interval split spoon from the original location for MW-41. Stiff grey clay was encountered from 5.0 feet to 15.0 feet bls. No well was installed here due to a lack of the upper aquifer material (sand). Working with EPA, a successful offset location was found for MW-41.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 18

Date: 7-17-96 Time: 0910

Photographer: Carter J. Helm

Description: West view of MW-39 which was completed on July 16, 1996. The protective casing or 'pro-top' was installed on top of the sand pack but not intersecting with the sand pack. Stability of the protective top was augmented by filling the space between the pro-top and well casing with bentonite as well as the standard procedure of using granular bentonite between the pro-top and the borehole.

Site: American Chemical Services, Inc. RD/RA

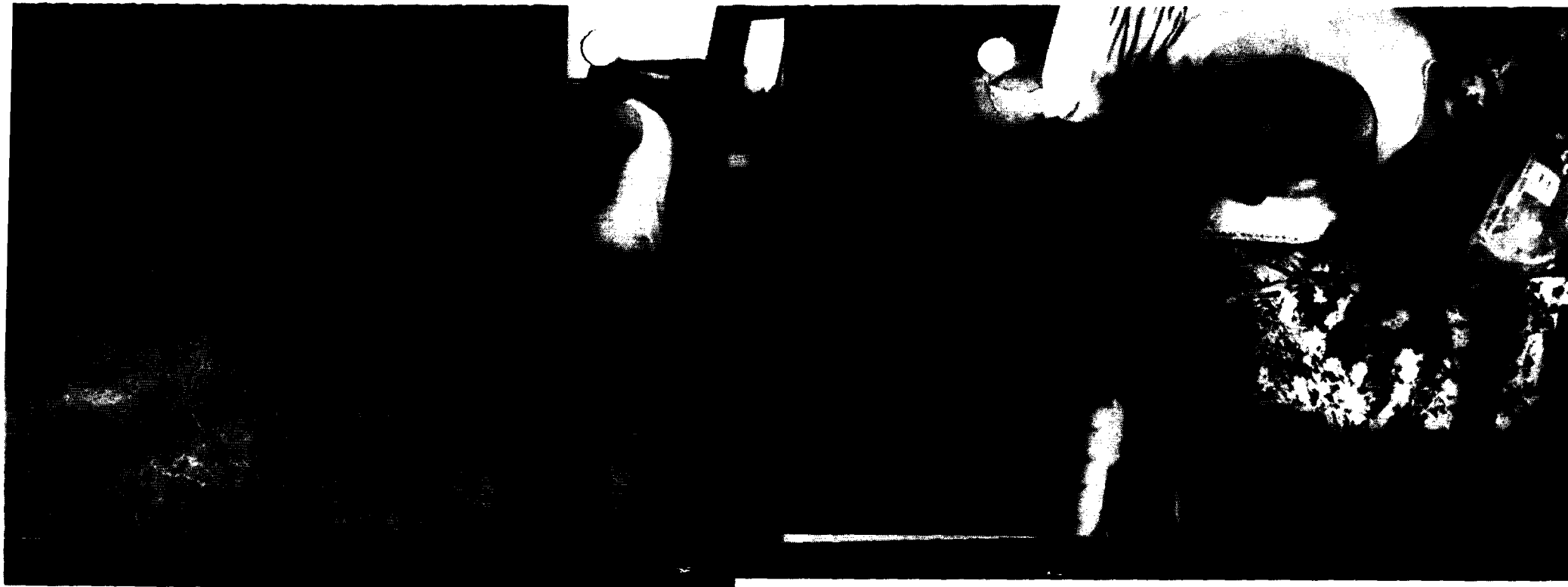
Proj. #: 71670

Roll: 1 Frame #: 19

Date: 7-17-96 Time: 0905

Photographer: Carter J. Helm

Description: An east view of MW-47 well construction. Notice the tape measure that is used to constantly determine the elevation of the well materials which are placed within the augers. Bentonite and/or sand bridging can also be detected and corrected using this method.



Site: American Chemical Services, Inc. RD/RA  
Proj. #: 71670

Roll: 1 Frame #: 20  
Date: 7-17-96 Time: 0840

Photographer: Carter J. Helm  
Description: East view of drillers beginning to bore and spoon MW-47. MW-47 is located south of Reder Road and southeast of Teeaway Manufacturing - a new business (truck scales) in the area.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 21  
Date: 7-16-96 Time: 1750

Photographer: Carter J. Helm

Description: West view of a driller slowly pouring Global Filter Sand #7 in the annular space between the well and borehole. The other driller would slowly raise the hollow stem auger drill string to allow well materials to properly fall in place around the well screen or casing. To ensure correct placement of sand or bentonite, drillers constantly used a deconned measuring tape downhole to keep track of the top of materials and to detect (and avoid) bridging.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 22

Date: 7-16-96 Time: 1725

Photographer: Carter J. Helm

Description: West view of drilling MW-39, west of Colfax Avenue. The two wash buckets in the foreground were used to clean stainless steel, 2 inch split spoons. After a well was constructed, all equipment, tools and the drill rig was thoroughly decontaminated using Alconox, brushes, and a high pressure steam machine prior to mobilizing to the next well location.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 23

Date: 7-16-96 Time: 1440

Photographer: Carter J. Helm

Description: Photograph of Montgomery-Watson personnel using a photo-ionizing device (PID) to detect any volatiles from split spoon samples. All PID readings were recorded on the appropriate field boring log. The PID's were also used to monitor any volatile vapors from the borehole during drilling. This photograph was taken at the MW-48 locale.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 24

Date: 7-16-96 Time: 1415

Photographer: Carter J. Helm

Description: South view of the Sterns drill rig split spooning at location 'M' or MW-49. MW-49 was positioned approximately 50 feet east of piezometer P-63.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 25

Date: 7-16-96 Time: 1405

Photographer: Carter J. Helm

Description: Northwest view of the Sterns Drilling Company's CMI 850 Track-driven drill rig entering the wooded area north of the ACS site (north of the railroad tracks). Two identical drill rigs were used for the Upper Aquifer Investigation. The drill rig pictured is mobilizing to the 'L' or MW-48 monitoring well location.



Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 00

Date: 7-19-96 Time: 1940

Photographer: Carter J. Helm

Description: West view off Colifax Road while departing Griffith, approximately 4 miles north of the ACS site. Flooding had completely submerged the road causing many traffic problems.

Site: American Chemical Services, Inc. RD/RA

Proj. #: 71670

Roll: 1 Frame #: 0

Date: 7-19-96 Time: 1900

Photographer: Carter J. Helm

Description: A close-up view of Montgomery-Watson personnel installing one of two staff gauges north of the railroad tracks near MW-48 and MW-38. Staff gauges were labelled SG-12 (downgradient, near MW-48) and SG-11 (upgradient, near MW-38).

